

1988
Seymour Canal
Sac Roe Herring
Fishery



Regional Information Report No 1J89-19

Alaska Department of Fish and Game
Division of Commercial Fisheries
Juneau, Alaska

December 1989

1988 SEYMOUR CANAL SAC ROE HERRING FISHERY

By

William Bergmann

Regional Information Report¹ No. 1J89-19

Alaska Department of Fish and Game
Division of Commercial Fisheries
Juneau, Alaska

December 1989

¹ The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

AUTHORS

William Bergmann is the Area Management Biologist for the Department of Fish and Game, Commercial Fisheries Division, Petersburg Area Office, P.O. Box 667, Petersburg, Alaska 99833.

ACKNOWLEDGEMENTS

Management assistance was provided by Randy Timothy, Robert Larson, Dennis Blankenbeckler, Brian Lynch, Bob DeJong, Joe Muir and Paul Larson. Willie Peteja, Ron Rusher, and Pete Philbin provided aerial and vessel support. Jackie Tyson and Julie Anderson provided critical review.

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	iv
LIST OF FIGURES	iv
INTRODUCTION	1
Background	1
Management History	1
STOCK ASSESSMENT	2
Trawling	2
Acoustical Surveys	2
Skiff Surveys	3
Aerial Surveys	3
Stock Estimation	3
SAMPLING	3
Throw Netting	3
Size Sampling	4
Maturity Sampling	4
Predators	4
SPAWN	5
Surface Spawn Observations	5
Diving Spawn Observations	5
1988 MANAGEMENT SUMMARY	5
1988 SEYMOUR CANAL DAILY HERRING LOG	6
1988 SEYMOUR CANAL LOG SUMMARY	10
CONCLUSION	12
LITERATURE CITED	13

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Seymour Canal on-the-grounds herring samples, 1988	14
2. Observations of predators, 1988. Aerial counts of humpback whales, sea lions, scoters, and seagulls	15
3. Seymour Canal herring spawn surveys, 1988	16
4. Annual Seymour Canal roe herring age composition, harvest, escapement, and egg density	17
5. Seymour Canal registration and buoy stickers, 1988	18

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Location of Seymour Canal	20
2. Seymour Canal herring age analysis	21
3. Seymour Canal herring population	21
4. Opening fishing areas in Seymour Canal, 1988	22
5. Seymour Canal daily spawn	23
6. Seymour Canal cumulative spawn	23
7. Seymour Canal spawn deposition, 1988	24

INTRODUCTION

Background

Seymour Canal is located between the Glass Peninsula and the main body of Admiralty Island about 60 miles northwest of Petersburg and includes Section 11-D and the northwest part of District 10 (Figure 1). The first known documentation of herring spawning in Seymour Canal was prior to 1931. Sometime before 1960 the area was reportedly fished for bait herring in the fall, and there was reportedly a herring saltery that operated in Pleasant Bay.

The first herring roe fishery occurred in Seymour Canal in 1971. It was managed by the Juneau staff with assistance from other management areas. In 1977, management of the roe fishery was assigned to the Petersburg-Wrangell management staff. This gave each of the then existing Southeast management areas a roe fishery to oversee.

Management History

The Seymour Canal fishery was initially managed similarly to the other new roe herring fisheries with the harvest quota based upon an assigned tonnage. When acoustical surveying methods proved relatively successful on winter stocks in other areas in the region, attempts were made to use this method for determining the Seymour Canal biomass. The harvest quota was then based upon 10 percent of the biomass. Throughout the mid to late 1970's attempts to use acoustical surveys proved unsuccessful. Extremely variable biomass estimates were obtained from analyzing the tapes obtained while doing the acoustical surveys. This variation was due to the fast-moving, dense schools. For a few years, the Windfall Harbor stock was considered a significant recruitment area for the spawning stock. The spawning portion of the Windfall Harbor stock was added to the biomass laying off the spawning grounds to determine the total biomass of spawning herring. Beginning in 1976, the threshold level concept was used in Seymour Canal. The spawning biomass of herring had to exceed the 5 million pound minimum threshold level for a fishery to occur. However on at least one occasion, the area staff's decision to keep the fishery closed because they did not feel the threshold level had been met, was overruled. By the late 1970's the fisheries management techniques in use did not seem to be maintaining or helping to build the stock; instead it appeared to be declining. In 1979 the first spawning ground analysis was done using SCUBA. The hope was that this method would provide a more accurate means of determining the size

of the spawning stock which would enable rebuilding. Between 1971 and 1979 the fishery was opened every year except 1975. The harvest ranged between 35 and 904 tons with an average of 452 tons.

In the early 1970's before Seymour Canal was an exclusive seine area, purse seiners accounted for all of the harvest except for a few tons taken by gillnetters. Fisheries in the early 1970's were supported by major year classes in 1965 and 1968. In the late 1970's and early 1980's no major year class predominated (Figure 2). In the fall of 1979 the Board of Fisheries changed the gear type from purse seine to set gill net and the minimum threshold level was increased to 6 million pounds. No fisheries occurred in 1980, 1982, 1983, or 1985 due to the lack of herring biomass necessary to meet the 6 million pound threshold level (Figure 3).

Annual spawning in Seymour Canal has historically taken place over about a 10 day period, however the majority of the spawn usually occurred during one day. The major spawn from 1982 through 1986 was on May 18, May 7, April 30, May 6 and May 11 respectively. This changed in 1987 when spawning peaked over a five day period. In 1988 the major spawn took place on April 25.

STOCK ASSESSMENT

Trawling

Mid-water trawling for herring size and maturity samples was attempted the afternoon of April 27. No fish were captured during the trawling conducted between #9 Rock and Dom Island. A number of schools were observed but they evaded the trawl.

Acoustical Surveys

Acoustical surveys were conducted April 18 and 19 and from April 25 through May 2. Most of the fish had spawned or were tight on the beach by April 25. These surveys were conducted off the R/V Steller using Omni sonar and a Ross 200A fine line chart recorder.

Skiff Surveys

Skiff surveys were made each from April 25 through May 2 and May 6 through May 9. These surveys usually covered the area between Pt. Hugh and Dorn Island. Observations of spawn, schools and whales were noted.

Aerial Surveys

Aerial surveys were made by the Department using Supercubs and Cessna 180's on April 21 and from April 25 through May 9. The area between Dorn Island and Pt Hugh and up the east side of the Glass Peninsula to the latitude of the pass at Twin Islands was surveyed each time. Other areas north to the head of the canal and the west side of the canal to the Big Bend were surveyed occasionally. Schools of herring, herring spawn, whales, sea lions, concentrations of birds, and concentrations of fishing vessels were recorded during these surveys.

Stock Estimation

No estimates of stock size were made this season because of the lack of fish in deep water and the relatively poor visibility for spotting fish in shallow water.

SAMPLING

Throw Netting

During spawning throw nets were used in the spawn to capture samples. The nets were usually eight feet in diameter. Throw netting was much more efficient than beach seines which were used during previous years. Samples could be taken in minutes from a number of different locations.

Size Sampling

Length-frequency sampling was done post season to determine the amount of recruitment into the stock. Samples were taken from the areas of active spawning.

Maturity Sampling

Ten to twenty kilogram samples of herring were analyzed by industry technicians for maturity. The results are shown in Table 1. Each fish was sexed with the females categorized into three classes: those far from spawning with white eggs, those close to spawning, and those that were ready to spawn. Spawnouts were determined to be fish which when squeezed released no roe or milt. Maturity increased during the three days the Department was involved in keeping track of the sampling (table 1). Industry sampling throughout the fishery answered a question that we had planned to answer post-season using a test fishing boat. No spawnouts or only very small numbers were observed in the catches during any of the fishing, even after 5 days of spawning had been occurring. The industry sampling indicated that the percentage of immature females was lowest on the first day (4%) and then jumped up to 26% on the second day probably due to new fish moving into the fishery. The percentage of immature females gradually decreased to 6% on the last day of the fishery. The percentage of mature roe mirrored these results. The percentage of mature females in the samples was the highest on the last two days of the fishery. The industry sampling indicates spawnouts move off the beach and aren't harvested in the spawning so there is not a great urgency to open the fishery on the day of peak spawning.

Predators

Large numbers of eagles, seagulls and scoters follow the herring into Seymour Canal to feed upon them when they are highly vulnerable during their spawning period. Dall porpoises, harbor seals, Steller sea lions and humpback whales also prey heavily upon the herring when they are on the spawning grounds. The earlier than normal spawning time appeared to catch humpback whales unprepared and only two of those were seen this season. The maximum numbers of other predators observed on a single day was 45 sea lions at the peak of spawning and 15,000 scoters and 9,200 gulls on May 2 (Table 2).

SPAWN

Surface Spawn Observations

The first spawn occurred at the tip of Black Jack Cove and was observed by a pilot from Juneau on April 24. This went unreported and the major spawn occurred on April 25 after several days of sunny weather. A total of 8.9 miles of spawn were observed that day and there were no other days that more than a mile of spawn was observed. Spawning lasted through May 4. Aerial surveys continued through May 9. A total of 16.5 nautical miles or 19 statute miles of spawn occurred (Table 3). This is the largest number of miles of spawn ever recorded in Seymour Canal.

Diving Spawn Observations

Divers conducted 40 dive transects. Two of those were eliminated and used only as check dives because of the lack of spawn. Three additional dives were done at the Rock Garden to decrease the sampling distance to 1/4 mile to see if the sampling intensity was high enough. They didn't alter the biomass calculations so they were only used as check dives and not figured into the spawn computations. Transects were done on 1/2 mile intervals from the tip of Pt. Hugh to inside Dorn Island. The transects averaged .389 million pounds per statute mile. Spawning was extremely light with only one transect inside Dorn Island having over one million pounds per mile. The two areas with the most consistent and heaviest densities were a mile between Dorn Island and #9 Rock and a mile just north of Pt. Hugh. Sampling indicated an escapement biomass of 6.5 million pounds assuming 10 percent of the eggs were lost to predators, wave action, and other natural causes prior to diving.

1988 MANAGEMENT SUMMARY

The 1988 Seymour Canal herring fishery was to occur if 6 million pounds of herring spawned in the area in 1987. The 1987 egg deposition surveys indicated 9.55 million pounds of herring spawned (Table 4). This population level allowed for a harvest rate of 11.18% which represented a guideline harvest level of 534 tons of herring in 1988. The 1988 fishery harvested 586.4 tons of herring. With an estimated roe percentage of 13.28% and an average estimated price for Seymour herring of \$1500 per ton with \$150 per percentage point above 10%, the average ton of herring was worth \$1992. This made the fishery

worth approximately \$1,168,000. This equals an average of \$12,166 per vessel registered in 1988 (Table 5).

1988 SEYMOUR CANAL DAILY HERRING LOG

- April 18: The Steller arrived in Seymour Canal with Randy Timothy aboard. The shore between Pt. Hugh and Dorn Island was surveyed on the way in and most of the fish were between Black Jack Cove and Sore Thumb. The schools were laying mostly between 4 fathoms and 25 fathoms. Fifteen schools were hit on the way in.
- April 19: The Steller departed Sore Finger at 6 a.m. Most of the fish were still laying in the Twin Is. to Rock Garden area. The schools were laying between 6 fathoms and 40 fathoms and were tight into the beach so trawling could not be done. Twenty three schools were hit. It appeared that there were more fish than last year. No fish were observed at Pt. Hugh. No whales, only 6 to 8 sea lions, and very limited numbers of birds were observed.
- April 21: The first aerial survey was conducted by Robert Larson. No fish or whales were observed while the numbers of sea lions had increased.
- April 24: A charter pilot observed the first spawn at the tip of Black Jack Cove at 2:00 p.m. but it was not reported until about one week later.
- April 25: The Petersburg Fisheries pilot observed major spawn at about 10 a.m. The announcement that the fishery would go on two hour notice at 4 p.m. tomorrow was made. The Steller had already planned to leave and they were in the area at 6 p.m. An aerial survey by Bergmann at 1 p.m. showed 9 miles of spawn. About a half a dozen schools were observed. The Steller surveyed the area between Pt. Hugh and Dorn Island. The spawning had dissipated to about half of what it was during the aerial survey. No large schools were observed with the sonar. By 11 p.m. 21 boats were registered and three samples had been taken. The fish appeared to be of good quality with few spawnouts however the official sampling would be done in the morning by the cannery technicians. During the aerial survey about 1/2 mile of milt was also observed at Bear Creek on Mitkof Island and about 3/4 mile was observed in the north arm of Farragut Bay. No spawn was observed in Port Houghton or Hobart Bay. However the schools were still leading the beach along the north shore of Hobart. The three samples taken during the evening which were worked up the next morning varied between 7 and 12%.

April 26: The first survey was done by skiff at 5 a.m. Spawning was limited to a few small spots from the Rock Garden southward with the largest spawn occurring northeasterly from Pt. Hugh for about 3/4 of a mile. No intense spawning was occurring. During an aerial survey at 6 a.m. spawn was observed in the same areas plus in several small spot north of Sore Finger Cove. Joe Muir and Willie Petaja arrived after making the survey in a Supercub. Jeff Kelly and Bob DeJong arrived at 7:30 a.m. and Robert Larson, Brian Lynch, Dennis Blankenbeckler and Paul Larson arrived at intervals during the remainder of the day. Test samples throughout the day were highly mixed. Mature roe percentages varied between 1% and 15% Considering the extensive spawn that occurred on the previous day there were very few spawnouts. The percentage of immature roe in some of the samples was surprisingly high. Without major signs of fish on the beach or large schools which could move in from the deep, it didn't appear that there was good justification for delaying the fishery. After a 15% sample was taken about 2 miles north of Pt. Hugh and real low percentage samples were taken at the Rock Garden it was decided to open the fishery. The fishery opening was announced at 2:45 for a 4:45 opening. The area between the gravestone marker just north of Twin Islands and Pt. Hugh was open within 2 miles of the shoreline. A total of 89 boats and 5 companies were registered when the fishery opened. With the large spawning the prior day, it was anticipated that the fishery would go slowly. A few small spots of spawn occurred in the open area. All but a few of the boats fished south of Black Jack Cove with a heavy concentration around Pt. Hugh. Catches were very slow with best catches occurring along the steep shore between the District boundary and the point northeast of Pt. Hugh. A skiff survey canvassed 63 vessels with the boats on the north end averaging 1.5 tons and the boats on the south end averaging 1 ton per boat. The closure for the evening was announced at 9 p.m. and the nets could not be reset after 10PM and had to be out of the water at 11 p.m. This was done because there was no spawn occurring, the tide would start ebbing at 11 p.m., and it was decided not to take the chance that a closure might occur in the darkness. At the closure of the fishery, it was estimated that 160 tons would be taken by the time all of the gear was out of the water. By the time the fishery closed 95 boats had registered for the opening. The reports from the processors at the end of the first day indicated 53 boats had delivered 89 tons of herring with an average roe percentage of 12.95%. Assuming an average of 1/2 ton per boat average for the 42 boats that didn't deliver, a total estimated harvest of approximately 120 tons had been harvested.

April 27: The fishery reopened at 5 a.m. in exactly the same area as the previous day. Fishing was very slow with most boats having only a few hundred pounds during the first couple of hours. An aerial survey was made at 6:30 a.m. and some real small spots of spawn were seen at Sore Thumb and inside Dorn Island. The largest spawn observed was only a couple hundred yards right inside Black Jack Cove. Based upon the limited catch to date and the poor catch this

morning it was announced that the fishing area would be expanded to include the east side of the Glass Peninsula up to Pt. Hugh Light which is about 3 miles north of Pt. Hugh. The area on the west side of the peninsula was expanded northward to the latitude of the northern tip of Dorn Island. Fishermen were cautioned that test samples taken the previous day had very mixed roe percentages with some good percentages and some poor percentages. They would be expected to monitor their catches and only harvest fish which were of adequate quality for their needs. When the fishery opened in the new area most of the boats moved north into the area between the Rock Garden and Sore Thumb Cove. Catches were spotty but they were better than the mornings catches. A few fishermen started complaining about the quality of the fish and they wanted the newly opened area closed. When the processors were contacted it turned out that only Icicle Fisheries had any samples from that area. The four samples they had at that time were extremely high in females (75%) and had relatively high percentage of immature fish (6.3%) however the mature roe percentages were still quite high (12.8%). The sample data was relayed to fishermen over the radio. They were also told these results were what might have been expected from the sampling the previous day. Mature roe percentages of this quality were considered very good and the gill net fishery had historically fished on 11 to 12% roe in Seymour Canal. The Steller surveyed the area between Pt. Hugh Light and Dorn Island. A good concentration of small schools that appeared to be prespawning in configuration were found from #9 Rock to inside Dorn Island. The fish were trawled on at 3:30 p.m. Although a number of schools were run over and showed up on the sounder they all evaded the trawl. No schools and only a few spot spawns in Black Jack Cove were observed during an aerial survey at 5 p.m. Catch rates remained very low and it appeared that about 200 tons of herring had been harvested to date. A total of 91 tons of herring had been checked out on tenders leaving the grounds.

April 28: The fishery was open throughout the night and about 80 of the boats fished the Rock Garden-Sore Thumb area. Catches were very low during the evening with most boats catching less than a quarter of a ton. During an aerial survey at 7 a.m. no schools were observed. A small spot of spawn was occurring in Sore Thumb and another small spot in Black Jack Cove. During aerial surveys at 10:30 and 3:30 no fish or spawn were observed. The fish still hadn't spawned in Hobart Bay. Tender reports at about 10:30 p.m. indicated that 120 tons were delivered today. One of the companies checked out of the grounds and about 10 fishing vessels left the area. The total tonnage that had been checked off the grounds was 204 tons with 310 tons actually on the tenders. Roe percentages were higher than the previous days with an average of about 13.5%.

April 29: No spawn was observed during aerial surveys at 8 a.m. and 3 p.m. All the vessels were fishing between the Rock Garden and Sore Finger Cove. Only a few schools were observed

out in the deep during a survey made from the Steller. The catch rate was very low. The fish were leading the beach in Hobart Bay but hadn't spawned yet. A couple of small spawns occurred around Sore Thumb Cove. A total of 370 tons of herring were reported delivered to the tenders.

April 30: First sunny day since Monday. Small spot spawns were occurring between Sore Thumb Cove and Sore Finger Cove early in the morning. Fishing picked up during the late evening and early morning. A survey of the fleet at 9 a.m. indicated there were a total of 400 tons delivered. An estimated 70 additional tons were aboard the 72 vessels that were counted from the skiff survey. An aerial survey was done at 11 a.m. and no schools were observed. Some dissipated spawn was observed north of Sore Thumb Cove. Some more spot spawns were observed inside Sore Thumb. At the evening tender check a total of 450 tons were aboard the tenders with another 20 tons in the nets.

May 1: A fire in the engine room of the Marine View got us up at 4:00 a.m. The fire was minimal but the fishery had picked up especially on the south end where one of the boats had eight tons. After checking the entire fleet and the tenders, an estimated 42 tons were aboard the skiffs and 460 tons were aboard the tenders. At 7:10 a.m., after rechecking the boats on the south end, a total of 470 tons were estimated to be aboard the tenders and 48 tons aboard the skiffs. The closure of the fishery was announced at 7:17 for 8:15. All the nets had to be out of the water by 9:15. At the closure it was estimated a total of 543 tons would be caught. At the end when the nets were hauled an estimated 560 tons were aboard. During the morning and afternoon aerial surveys, small spot spawns were observed north of Twin Islands and in Sore Thumb Cove. The largest active spawn was occurring along the Stone Wall south of Cypress Rock.

May 2: During the aerial survey, active spawn was occurring south of the Rock Garden and in Sore Thumb and along the Stone Wall. During a skiff survey at low tide an additional 2.0 miles of existing spawn was documented. This filled in most of the areas between the already documented spawn.

May 3: Only a small spot spawn was observed during the aerial survey.

May 4: A small spot of spawn occurred north of Sore Thumb and six small spawns were observed between Pt. Hugh and Pt. Hugh Light.

May 5: No spawning or schooled herring were observed.

- May 6: The R/V Sundance arrived at Seymour Canal in preparation for herring dive surveys. No spawn was observed during skiff or aerial surveys.
- May 7: No spawn was observed during dive surveys or the aerial survey. During skiff surveys on the east side of the Glass Peninsula and a dive parallel to the beach in the largest concentration of spawn observed on May 4, no eggs were found.
- May 8: No spawn was observed during dive surveys or the aerial survey.
- May 9: The dive surveys were completed, the R/V Sundance departed Seymour Canal. No spawn was observed and no schools were observed along the normal spawning area. Twenty-one small schools were observed along the west shore of the Canal between Pleasant Bay and Buck Island plus 3 more at Dorn Island. They didn't appear to be spawning schools.

1988 SEYMOUR CANAL LOG SUMMARY

- April 18: Fifteen schools lying between 4 and 25 fathoms mostly between Black Jack Cove and Sore Thumb were observed from the Steller.
- April 19: Twenty three schools were observed lying between 6 and 40 fathoms mostly between Twin Islands and the Rock Garden. It appeared that there were more fish than in 1987.
- April 21: During the first aerial survey no fish were observed.
- April 24: A charter pilot observed the first spawn at the tip of Black Jack Cove at 2 p.m., but it was not reported until about a week later.
- April 25: A major spawn was reported by an industry pilot at 10 a.m. A news release at noon put the fishery on two hour notice effective 2 p.m., April 26. Nine miles of spawn was observed between Dorn Island and Pt. Hugh at 1 p.m. The Steller arrived in the area at 6 p.m. Spawning had dissipated. No large schools were observed from the Steller. Twenty-one boats registered for the fishery. Three samples taken later tested out to between 7 and 12%.
- April 26: During an aerial survey at 5 a.m. about one mile of spawn was observed mostly by Pt Hugh. Test samples varied between 5 and 15% with extremely high percentages of females. With one 15% sample south of Black Jack Cove and mixed samples in the Rock Garden and no

major sign of fish on the beach or out in the deep and opening was set for 4:45 p.m. The area between the gravestone marker and Pt. Hugh was opened. A total of 89 boats were registered for the fishery when it opened and 6 more registered before the end of the day. Fishing went slowly with most of the boats concentrating south of Black Jack Cove. The fishery was closed at 10 p.m. Fifty-three boats delivered 89 tons of fish with an average roe percentage of 12.95%. An estimated 120 tons of fish were harvested with the other 42 boats no delivering their fish.

- April 27: The fishery opened at 5 a.m. in the same area and was extended to between Pt. Hugh Light and the latitude of the northern tip of Dorn Island at 9 a.m. Fishing was very light and only a few small spot spawns occurred. Most of the boats moved into the Rock Garden when it opened. Roe percentages stayed around 13% however the percentage of immature females was around 6%. Trawling on piling type schools inside Dorn Island during the day was unsuccessful and by nightfall those fish had moved into the beach and were too shallow to trawl. An estimated 91 tons of fish were tendered off the grounds, 160 total tons were reported delivered and an estimated 200 tons had been harvested.
- April 28: The fishery remained open throughout the night with 80 of the boats in the Rock Garden-Sore Thumb Cove area. Eight boats and one company checked out of the fishery. A total of 310 tons were aboard the tenders including 204 tons that had been checked off the fishing grounds. Roe percentages were averaging about 13.5%.
- April 29: Only two spot spawns were observed and catch rates were very low. All the vessels were fishing between the Rock Garden and Sore Finger Cove. A total of 370 tons were reported delivered to tenders.
- April 30: Spot spawns increased on this first sunny day since the major spawn. Fishing picked up in the morning and by evening the tenders had an estimated 450 tons aboard with another 20 tons in the nets and skiffs. Only 72 vessels were left in the fishery.
- May 1: Fishing was good overnight and the early morning check showed an estimated 42 ton aboard the fishing boats and 460 tons aboard the tenders. After the second check of the boats on the south end at 7:10 a.m. it was estimated that there were 48 tons aboard the fishing boats and 470 tons aboard the tenders. The closure was announced at 7:17 a.m. for 8:15 a.m. which meant all of the nets had to be out of the water by 9:15 a.m. When the closure was announced, it was estimated 543 tons would be harvested. By the time the nets were all out of the water, it was estimated that 560 tons had been harvested. When the last fish ticket was

received from the processors about a month later, a total of 586 tons had been landed with an average roe percentage of 13.3%.

May 2: This was the last day of active spawn that was larger than just spot spawns. A skiff survey during low tide documented an additional 3.1 statute miles of eggs that milt hadn't been observed along during prior aerial and skiff surveys.

May 3 and

May 4: Only a few small spot spawns were observed during aerial surveys.

May 5: No spawn or herring were observed.

May 6 through

May 9: Aerial surveys were conducted every day and skiff surveys were conducted from the R/V Sundance during the dive surveys. A total of 43 transects were done over 16 miles of spawn.

CONCLUSION

The fifth set gill net herring sac roe fishery occurred at Seymour Canal in the spring of 1988; prior to 1980 Seymour Canal was a designated seine fishing area. The harvest of 586 tons was 9.7% above the guideline harvest level of 534 tons. This, was the second highest gill net harvest, was somewhat above the average gill net harvest of 477 tons. Roe recovery of 13.28%, the highest ever recorded, the excellent price, and the large catch combined to make it the most valuable fishery to date worth almost 1.2 million dollars. Vessel effort was above average with 96 vessels registered. The 4 1/3 day fishery, the longest on record, was not opened until after the major spawn occurred on April 25, the earliest ever recorded. More miles of spawn were observed than ever before but diving showed that the numbers of eggs deposited per mile were the lowest on record. No major year class of herring entered the fishery and the estimated biomass of the herring that escaped to spawn was only 6.5 million pounds. This is barely above the 6 million pound threshold limit which will allow a small fishery of just over 300 tons in 1989.

LITERATURE CITED

Bergmann, W.B. 1987. Seymour Canal Sac Roe Herring Fisher, 1987. Annual Report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Petersburg, Alaska.

Table 1. Seymour Canal on-the-grounds herring samples, 1988.

Date	Gear	Mesh Size	Vessel Name	Sample	Sample Location	-----Numbers of Herring-----			Roe %	Roe % Imm.		Number Spawned Out	% of	% of Females Mature	Total Number Sampled	Avg. Wt. in Grams	
				Size		-----Females-----	Males	Mat.	Immat.	Mature Females	Close		Far				Females In Sample
				in Kilograms													
25-Apr	G.N.		Condor	10	Sore Finger Cove	27	27	9	7.6%	1.2%	2.0%	4	57%	75%	63	159	
25-Apr	G.N.	2 1/4"	Starship	10	Pt. Hugh	26	41	1	11.7%			3	62%		68	147	
25-Apr	G.N.	2 1/4"	Starship	10	Blackjack Cove	33	31	3	10.6%	0.6%	0.3%	1	51%	91%	67	149	
26-Apr	G.N.		Misty Dawn	10	Blackjack Cove	41	40	3	8.1%		0.8%	0	51%	93%	84	119	
26-Apr	G.N.		Misty Dawn	10	Blackjack Cove	38	35	2	9.0%		0.9%	4	49%	95%	75	133	
26-Apr	G.N.	2 1/4"	Clancy	10	Rock Garden	26	36	6	12.1%	1.0%	1.1%	1	62%	86%	68	147	
26-Apr	G.N.		Darcy	10	Inside Dorn Is.	14	21	30	7.3%	2.1%	9.3%	0	78%	41%	65	154	
26-Apr	G.N.	2 1/4"	Fairlight	10	Inside Dorn Is.	17	18	27	6.3%	4.7%	5.4%	2	73%	40%	62	161	
26-Apr	G.N.		Condor	10	Sore Thumb Cove	33	2	27	0.9%	5.5%	9.7%	4	47%	7%	62	161	
26-Apr	G.N.		Condor	10	Sore Thumb Cove	45	8	29	1.8%	5.2%	6.1%	8	45%	22%	82	122	
26-Apr	G.N.	2 1/8"	Laurier	11	Rock Garden	37	21	15	6.3%			1	49%	58%	73	151	
26-Apr	G.N.	2 1/4"	Flight	10	2m. N. Pt. Hugh	31	37	1	15.2%			1	55%	97%	69	145	
26-Apr	Throw Net		ADF&G	10	Blackjack Cove	65	18	0	2.9%			12	22%	100%	83	120	
27-Apr	G.N.			10	Rock Garden	18	37	18	15.0%	7.5%			75%	67%	73	137	
27-Apr	G.N.		Icicle	10	North Rock Garden	13	40	4	9.4%	8.2%			77%	91%	57	175	
27-Apr	G.N.		Icicle	10	Rock Garden	19	31	13	13.0%	2.8%		4	70%	70%	63	159	
27-Apr	G.N.		Icicle	10	Cypress Rock	14	32	17	13.7%	6.7%		1	78%	65%	63	159	
27-Apr	G.N.		Icicle	10	Sore Thumb Cove	10	6	49	2.0%		17.9%	0	85%	11%	65	154	
27-Apr	G.N.		Silver L.	10	Rock Garden	10	37	16	12.0%	5.0%		4	84%	70%	63	159	
27-Apr	G.N.		Silver L.	13	Rock Garden	21	47	14	13.0%			1	74%	77%	82	159	
27-Apr	G.N.		Icicle	10	Rock Garden	14	29	24	7.5%	9.4%		1	79%	55%	67	149	
27-Apr	G.N.		Icicle	20	Rock Garden	32	16	92	2.6%	31.0%		1	77%	15%	140	143	
27-Apr	G.N.		Icicle	20	Rock Garden	36	67	13	11.6%	7.3%		5	69%	84%	116	172	
27-Apr	G.N.		Icicle	20	Rock Garden	45	66	12	11.2%	5.8%		1	63%	85%	123	163	
27-Apr	G.N.		Icicle	20	1/2 RkGdn 1/2 BkJ	44	57	25	11.4%	10.2%		10	65%	70%	126	159	
27-Apr	G.N.		Icicle	20	1/2 RkGdn 1/2 BkJ	40	38	40	6.8%	14.1%		7	66%	49%	118	169	

Table 2. Observations of predators, 1988. Aerial counts of humpback whales, sea lions, scoters, and seagulls.

Date	Whales	Sea Lions	Scoters	Seagulls	Comments
18-Apr-88		6			Steller Arrived
19-Apr-88		8			Steller Departed
21-Apr-88	0	47			
24-Apr-88					First Spawn
25-Apr-88	0	45			Steller Arrived
26-Apr-88	0	32			Fishery Opened
27-Apr-88	0	23			
28-Apr-88	0	9			
29-Apr-88	1	9	10,000	8,500	
30-Apr-88	0	8			
01-May-88	0	22			Fishery Closed
02-May-88	0	0	15,000	9,200	Steller Departed
03-May-88	0	a few			
04-May-88	2	14	10,000	10,600	Last Spawn
05-May-88	0	a few			
06-May-88	1	15			Sundance Arrived
07-May-88	0	2			
08-May-88	0	0			
09-May-88	0	0			Sundance Departed
Maximum	2	45	15,000	10,600	

Note: Surveys are generally more affected by whether or not the observer records sightings than the presence or absence of the birds or marine mammals. However, peak numbers are probably representative of the population present.

Table 3. Seymour Canal herring spawn surveys, 1988.

Date	Statute Miles of Spawn	Statute ^{a/} Cumulative Miles	Aerial Survey in Military Time	Other Survey Methods
18-Apr	0.0	0.0		Steller
19-Apr	0.0	0.0		Steller
21-Apr	0.0	0.0	1130	
24-Apr	0.2	0.2	1400	Wings Airlines
25-Apr	10.3	10.4	1200	Steller
26-Apr	5.8	13.2	0600,1030,1900	Steller/Skiff
27-Apr	0.3	13.3	0700,1000,1700	Steller/Skiff
28-Apr	0.3	13.5	0700,1030,1500	Steller/Skiff
29-Apr	0.6	14.1	0800,1500	Steller/Skiff
30-Apr	0.6	14.5	1100,1700	Steller/Skiff
01-May	0.8	15.1	1000,1400	Steller/Skiff
02-May	0.7	15.5	1000	Steller/Skiff ^{b/}
02-May	3.1	18.6	"old spawn"	minus tide->ski
03-May	spot	18.6	0900	
04-May	0.4	19.0	0800	
05-May	0.0	19.0	0830	
06-May	0.0	19.0	1300	
07-May	0.0	19.0	1430	Sundance/skiff
08-May	0.0	19.0	1400	Sundance/skiff
09-May	0.0	19.0	0930	Sundance/skiff

^{a/} 19.0 statute miles = 16.5 nautical miles

^{b/} Spawn observed from the skiff on May 2 during low tide probably occurred on April 25 from the reports received from an industry pilot that flew the morning of the 25th.

Table 4. Annual Seymour Canal roe herring age composition, harvest, escapement, and egg density.

Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	Average
<u>AGE</u>															
II	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
III	4.3	0.0	0.0	8.0	3.9	53.0	6.0	1.0	11.2	18.0	5.0	6.0	6.2	1.6	8.9
IV	30.0	7.7	5.0	17.0	14.5	25.0	72.0	16.0	9.8	11.0	35.0	11.2	12.6	16.0	20.2
V	10.6	18.2	8.0	15.0	19.0	11.0	18.0	73.0	35.0	10.0	19.0	47.5	27.5	14.0	23.3
VI	8.5	12.5	38.0	8.0	7.8	3.0	2.0	9.0	39.8	28.0	15.0	17.0	30.9	27.2	17.6
VII	17.0	11.8	12.0	18.0	4.5	8.0	2.0	1.0	3.4	30.0	16.0	11.0	14.7	25.0	12.5
VIII & +	29.4	49.8	38.0	33.0	50.3	0.0	0.0	0.0	0.8	3.0	11.0	7.5	8.0	16.4	17.7
Total %	99.8	100.0	101.0	99.5	100.0	100.0	100.0	100.0	100.0	100.0	101.0	100.2	99.9	100.2	100.1
N =	330	313	110	206	179	95	231	188	667	640	688	490	934	608	406
Gear	PSeine	PSeine	PSeine	PSeine	PSeine	Gill Net	Gill Net	Gill Net	Gill Net	Gill Net	Gill Net	Gill Net	Gill Net	Gill Net	
Harvest	0.00	0.50	0.96	1.57	0.53	0.00	1.50	0.00	0.00	1.03	0.00	0.68	0.61	1.17	0.6
<u>BIOMASS</u>															
Method		Acoust	Acoust	Egg Den	Acoust	Egg Den	Egg Den	Egg Den	Egg Den	Egg Den	Egg Den	Egg Den	Egg Den	Egg Den	
Estimate		4.00	8.23	1.05	5.00	11.39	3.10	2.68	8.03	3.90	6.00	7.9	9.55	6.5	5.95
<u>ESCAPEMENT</u>															
Millions of Pounds		3.5	7.3	1.1	4.5	11.4	3.1	2.7	8.0	3.9	6.0	7.9	9.6	6.5	5.8
<u>EGG DENSITY</u>															
Millions of Eggs per Square Meter				0.89		1.10	0.32	0.38	0.38	0.18	0.44	0.36	0.64	0.36	0.51
<u>HARVEST</u>															
Millions of lbs.	0.00	0.50	0.96	1.57	0.53	0.00	1.50	0.00	0.00	1.03	0.0	0.68	0.61	1.17	0.61

Table 5. Seymour Canal registration and buoy stickers, 1988.

First Name	Last Name	Permit Number	Original Sticker Numbers	Replacement Sticker Numbers	ADF&G Number	Date of Registration	Capacity in Tons
ALAN	ALMQUIST	G34A52808C	131,132		48524	4/26	20
AL	ANDERSON	G34A52802X	103,104		27684	4/26	8
PAUL	ARRINGTON	G34A65436L	(105,106)	272,273	50919	4/26	10
INGVALD	ASK	G34A52809U	57,58		45644	4/26	5
AL	BABBONI	G34A52811E	195,196		48279	4/26	7
HAROLD	BAILEY	G34A65051B	99,100		32793	4/26	5
WILLIAM	BAINES	G34A52812V	(119)	120,279	33977	4/26	15
RUSSEL	BARTOO	G34A52834B	69,70		48538	4/25	10
GARY	BAXTER	G34A65387A	167,168		56131	4/26	15
RANDY	BAXTER	G34A52806R	217,218		48487	4/26	15
JAMES	BECKER	G34A65028F	(199,200)	262,263	32770	4/26	15
DALE	BOSWORTH	G34A65448K	97,98		53347	4/26	12
MIKE	BOWEN	G34A65480M	(209,210)	275,276	24338	4/26	20
RON	BUSCHMANN	G34A65070F	(19)	20,264	23339	4/26	6
RICK D.	CARR	G34A52835S	231,232		31397	4/26	12
DICK T.	CARR	G34A65476S	233,234		31399	4/26	16
SONNY	CARR	G34A65608L	185,186		31398	4/26	15
CHARLES	CLEMENT	G34A65389K	85,86		27397	4/26	6
KARL	COOK	G34A65422K	153,154		24307	4/26	10
CARL	CROME	G34A64962V	1,2		27865	4/25	18
PHIL	CUNNINGHAM	G34A52827G	175,176		43526	4/26	5
JEROME	DAHL	G34A65048A	23,24		50956	4/26	
GEORGE	DAUBER	G34A65172X	191,192		49423	4/26	12
ROBIN	DEXTER	G34A52814G	(91,92)	267,268	32713	4/26	14
ROBERT	DICKINSON	G45A65383G	73,74		50645	4/26	8
JOHN	DUCKEN	G34A52828X	(206)	205,269	45586	4/25	15
IRVING	DUNDAS	G34A52813N	(177,178)	288,289	7956	4/26	10
JOHN	EIDE	G34A52831Z	101,102		36570	4/25	20
JOHN	ELDING	G34A65047I	61,62		48453	4/26	
JOHN	EMDE	G34A65395N	5,6		48309	4/26	15
ARNOLD	ENGE	G34A65161I	67,68		27654	4/26	9
STEVE	ENGE	G34A65094V	113,114		48144	4/26	20
SUSAN	ERICKSON	G34A64948F	179,180		31452	4/26	10
JEFF	GOLDEN	G34A65489S	(145,146)	277,278	45801	4/26	6
GALE	GOOD	G34A65077B	33,34		27570	4/25	8
DAVID	GOTH	G34A65537E	(81,82)	286,287	55462	4/26	10
DEAN	GRAHAM	G34A65386I	215,216		50882	4/26	16
ROGER	GREGG	G34A65031G	(10)	9,260	24675	4/25	6
DICK	GREGG	G34A65049R	17,18		32690	4/25	6
TONY	GUGGENBICKLER	G34A65472Z	107,108		43326	4/26	12
SVEN	HALSTENSEN	G34A65475B	(77,78)	270,271	55539	4/26	
JANET	HAYNES	G34A65173F	125,126		48859	4/26	12
GEORGE	HIGGINS	G34A65158H	187,188		40117	4/26	15
RICHARD	HOFMANN	G34A52803PT	65,66		32475	4/26	3
CHRIS	HOLM	G34A65465E	127,128		45807	4/26	12
MICHAEL	HOLM	G34A65162A	45,46		54918	4/26	20
HANS	HOLUM	G34A65463S	203,204		32656	4/26	6
GLENN	JOHNSON	G34A52830H	173,174		45855	4/26	15
PETER	JOHNSON	G34A65473Q	(139,140)	280,281	31886	4/26	10
DOUGLAS	KARLBERG	G34A65512V	(3,4)	284,285	26586	4/26	5
PATTI	KARUZA	G34A64964G	87,88		55662	4/25	16

--Continued--

Table 5. (Page 2 of 2.)

First Name	Last Name	Permit Number	Original Sticker Numbers	Replacement Sticker Numbers	ADF&G Number	Date of Registration	Capacity in Tons
FRANK	KLEPSE	G34A65088Q	115,116		32797	4/26	8
DAVE	KLEPSE	G34A65098O	191,192		30340	4/26	15
JOHN	KNIGHT	G34A65481F	35,36		31757	4/25	10
JAY	KOETJE	G34A65145H	171,172		53433	4/26	15
JAY	KOERTH	G34A65479V	43,44		55720	4/26	20
JIM	LARSON	G34A65421R	27,28		29780	4/25	10
CHESTER	LEE	G34A52807K	129,130		50856	4/26	16
TED	LEWIS	G34A65209S	75,76		31294	4/25	15
ROCKY	LITTLETON	G34A64967I	123,124		31441	4/25	
LOREN	LUNDQUIST	G34A65406J	225,226		31430	4/26	8
DAVID	MARTIN	G34A64965X	53,54		26951	4/26	9
MORRIS	MATTSON	G34A65093C	21,22		45591	4/25	
NEVIN	MAY	G34A65355W	111,112		48476	4/26	7
ROBERT	MCDONNEL	G34A65396G	63,64		28298	4/26	10
PHILLIP	MEEKS	G34A65059P	29,30		31993	4/25	
DENNIS	O'NEIL	G34A65412M	157,158		43300	4/25	8
HERBERT	OHARA	G34A65462B	141,142		43425	4/26	10
DOMINIC	PAPETTI	G34A65514G	207,208		53462	4/26	10
JOHN	PASQUAN	G34A65511E	55,56		52395	4/26	15
TONY	PECKARIC	G34A65391S	25,26		45571	4/26	12
KEN	PENTTILA	G34A65042V	137,138		32625	4/26	8
FRED	PFUNDT	G34A65079L	7,8		31360	4/26	9
JAMES	PORTER	G34A65382N	282,283		36592	4/26	8
DARREL	POPE	G34A52825V	(221,222)	265,266	21478	4/26	9
JOSEPH	PRINCEN	G34A65474J	143,144		46207	4/26	15
LARRY	REED	G34A64966P	89,90		53285	4/25	12
PAUL	RESKUSICH	G34A65420A	37,38		55591	4/26	6
MARK	SALDI	G34A65057G	121,122		32779	4/25	
AMY	SCHARNS	G34A65163R	117,118		26952	4/25	9
MIKE	SCHWARTZ	G34A65171G	83,84		32241	4/25	7
BRENDA	SEE	G34A65104X	183,184		48349	4/26	10
JEV	SHELTON	G34A65021I	71,72		26326	4/26	6
ED	SHERMAN	G34A52836L	(149)	150,290	54269	4/26	12
RALPH	SORENSEN	G34A65384X	59,60		36412	4/26	
JAMES	STROMDAHL	G34A64961E	(170)	169,291	55451	4/26	15
RICHARD	STURGILL	G34A52823L	47,48		45892	4/26	20
ADELLE	SWANSON	G34A52819RT	219,220		31856	4/25	8
MIKE	TAMMAN	G34A52826N	161,162		31474	4/26	10
STEVE	THYNES	G34A64963N	31,32		23332	4/25	10
JOYCE	VEAZEY	G34A52824E	197,198		48470	4/26	
JERRY	WELCH	G34A65155F	(51)	52,261	45763	4/26	12
TODD	WELSH	G34A65608L	49,50		33326	4/26	
CHARLES	WILLS	G34A65381V	109,110		36363	4/26	10
THOMAS	WIRTZFELD	G34A65160P	159,160		32801	4/26	12
STAN	WOOD	G34A65078S	15,16		22776	4/26	
Number of Registered Vessels - 96							

Note: Original sticker numbers in parenthesis should not be in the 1988 Seymour Canal herring fishery.

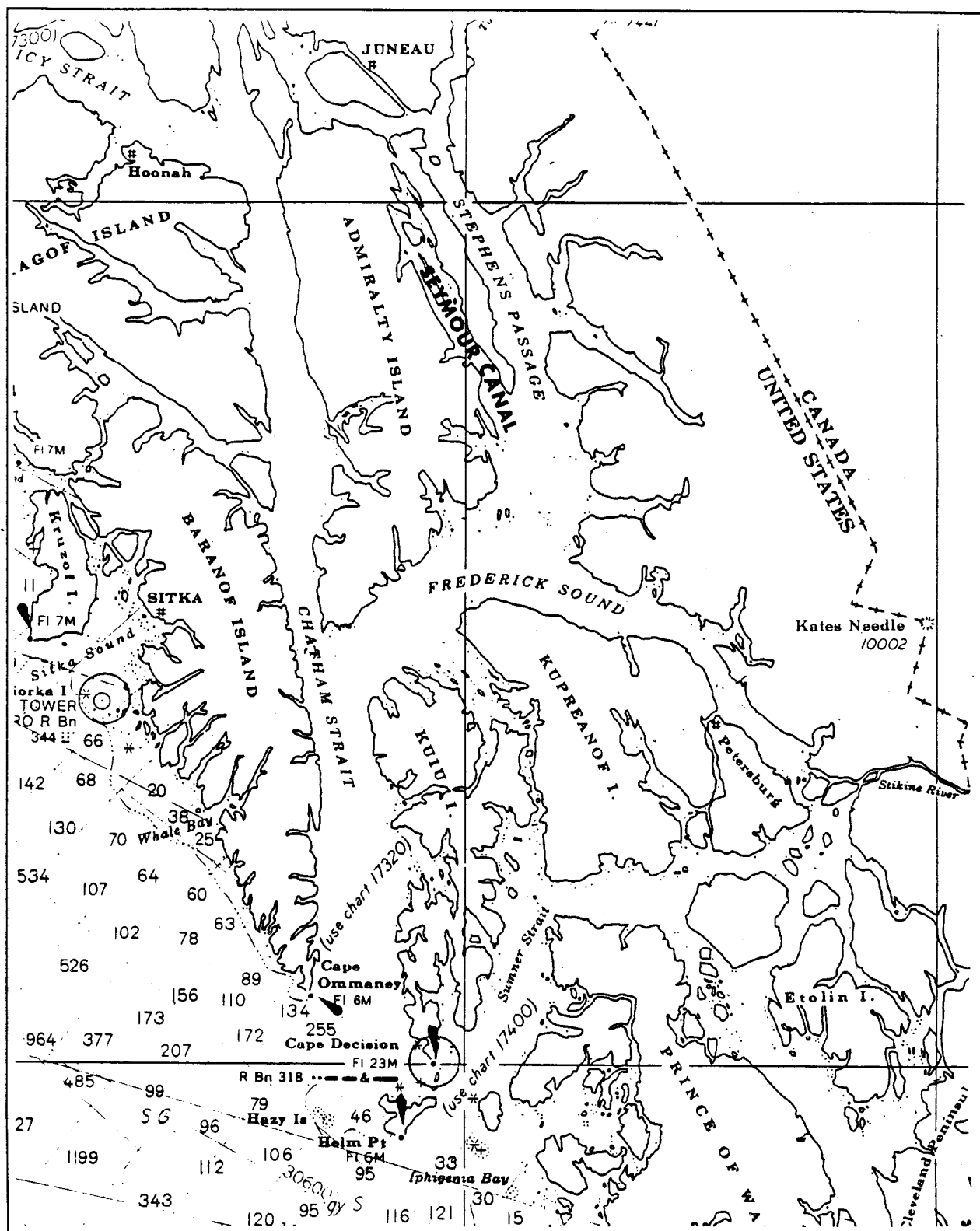


Figure 1. Location of Seymour Canal.

Figure 2.

SEYMOUR CANAL HERRING AGE ANALYSIS

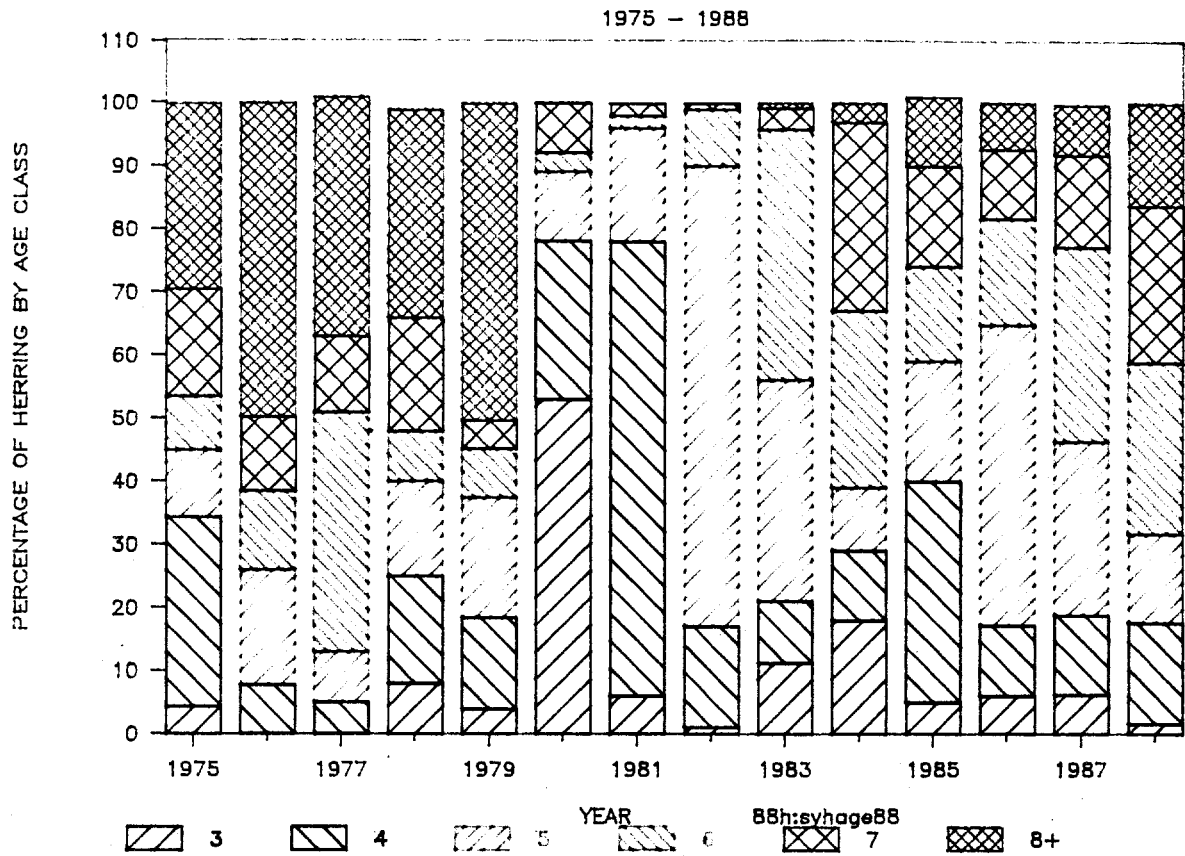
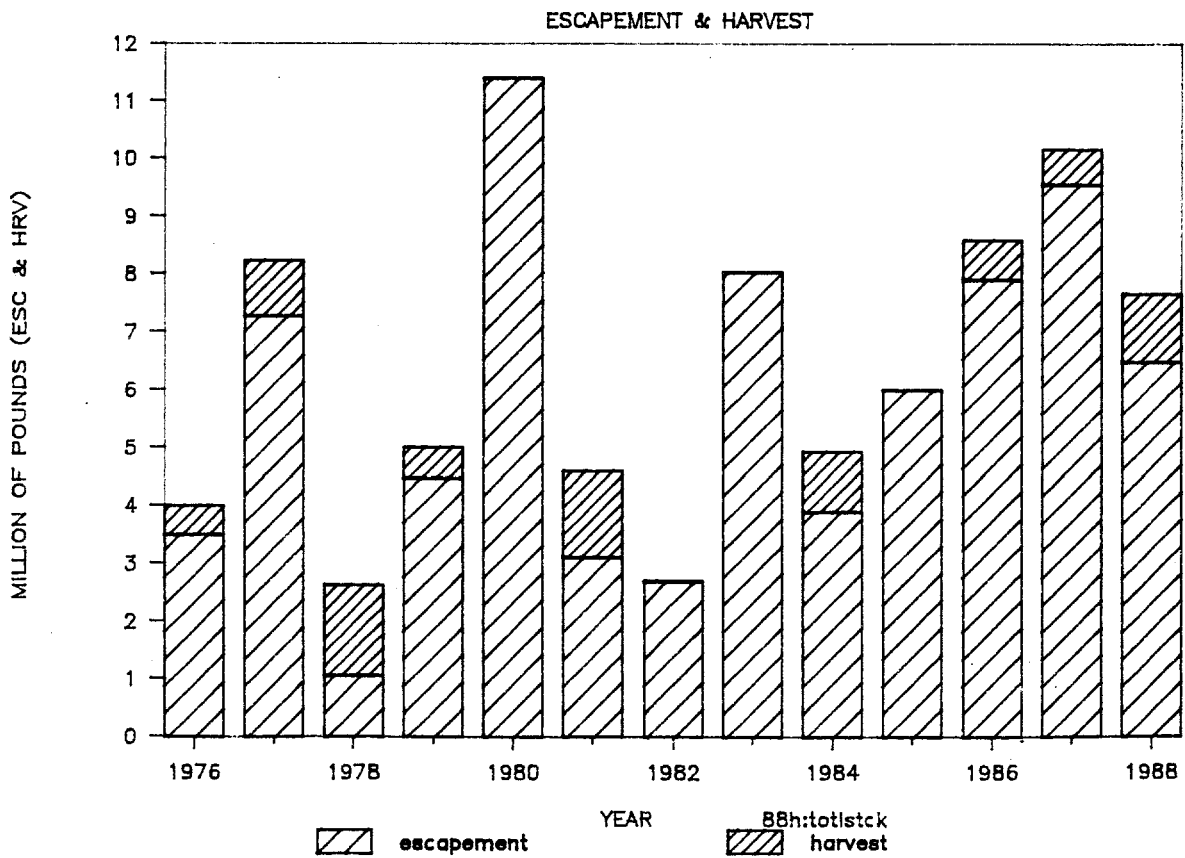


Figure 3.

SEYMOUR CANAL HERRING POPULATION



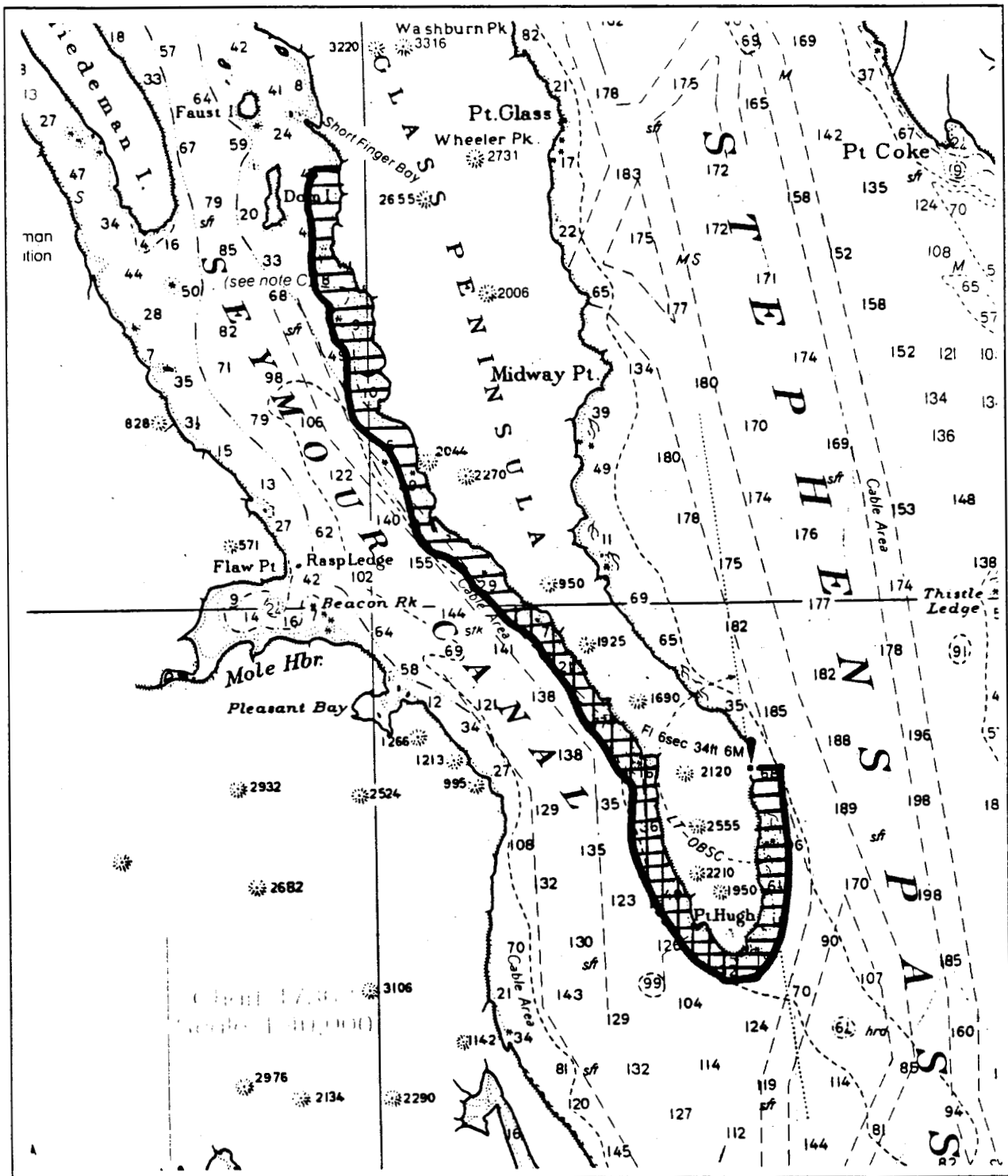


Figure 4. Opening fishing areas in Seymour Canal, 1988.



April 26, 4:45 p.m. to 10:00 p.m.



April 27, 10:00 a.m. to May 1, 8:15 a.m.

Figure 5.

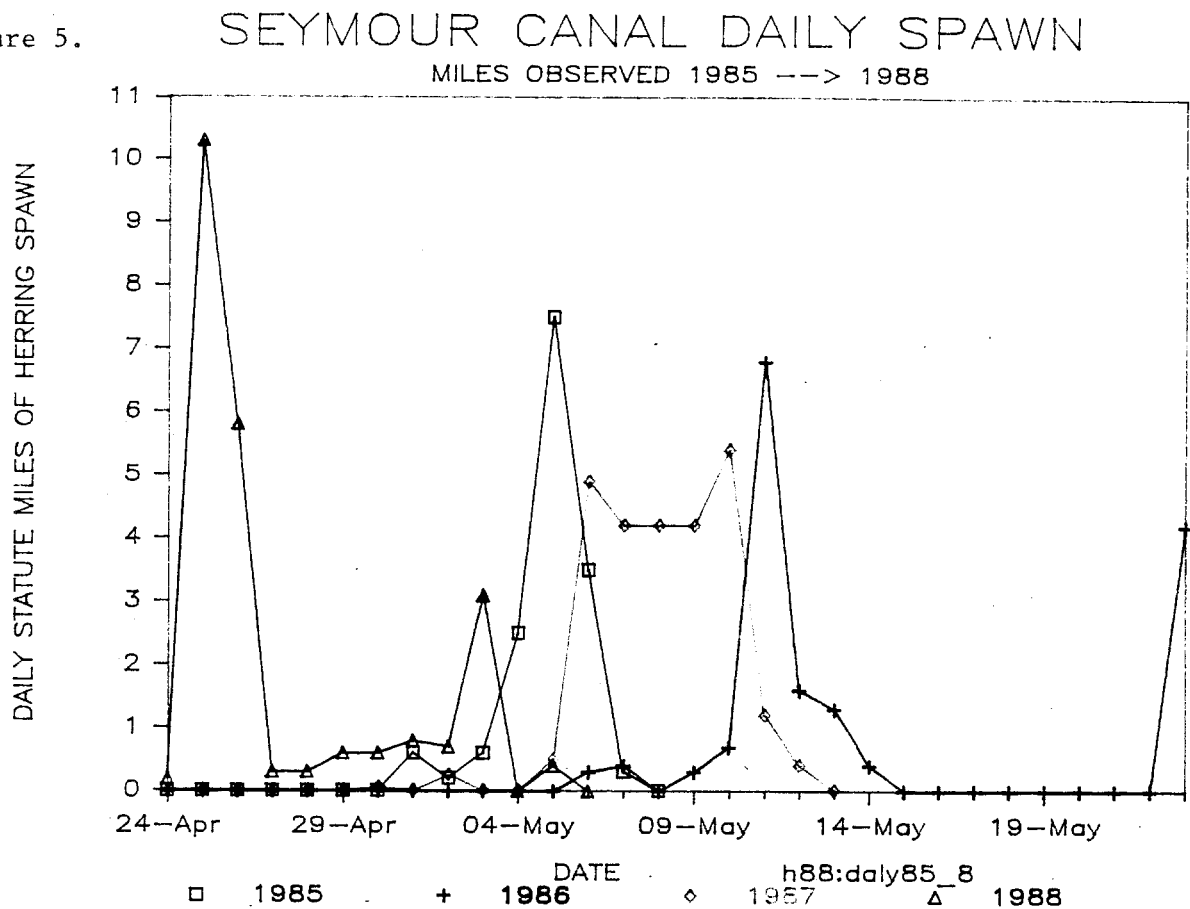
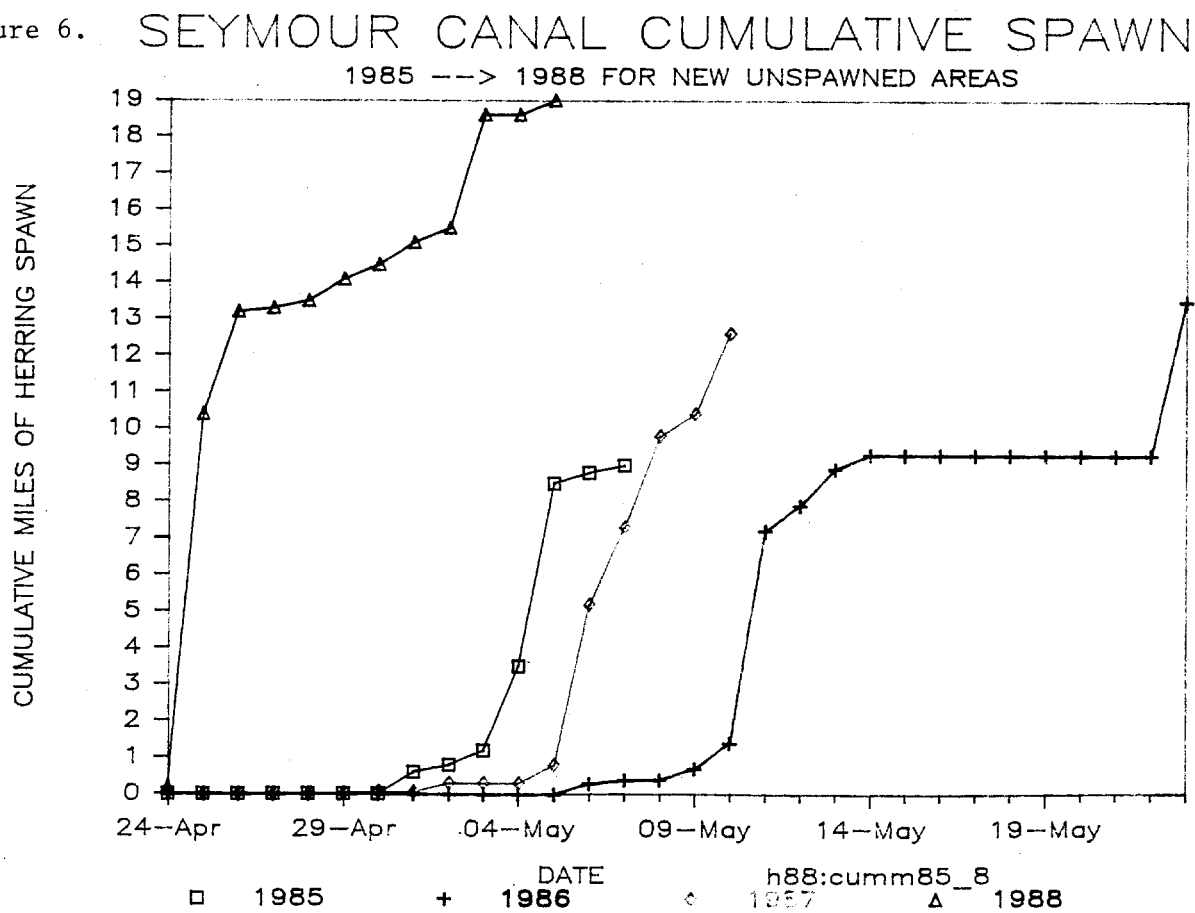


Figure 6.



Because the Alaska Department of Fish and Game receives federal funding, all of its public programs and activities are operated free from discrimination on the basis of race, religion, color, national origin, age, sex, or handicap. Any person who believes he or she has been discriminated against should write to:

O.E.O
U.S. Department of the Interior
Washington, D.C. 20240